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Version: September 12, 2024, LiFePO<sub>4</sub> Batteries for Floor Cleaning Machines



# LiFePO<sub>4</sub> Batteries

## for Floor Cleaning Machines

Drop-in lithium-ion  
for lead-acid  
alternatives



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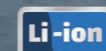
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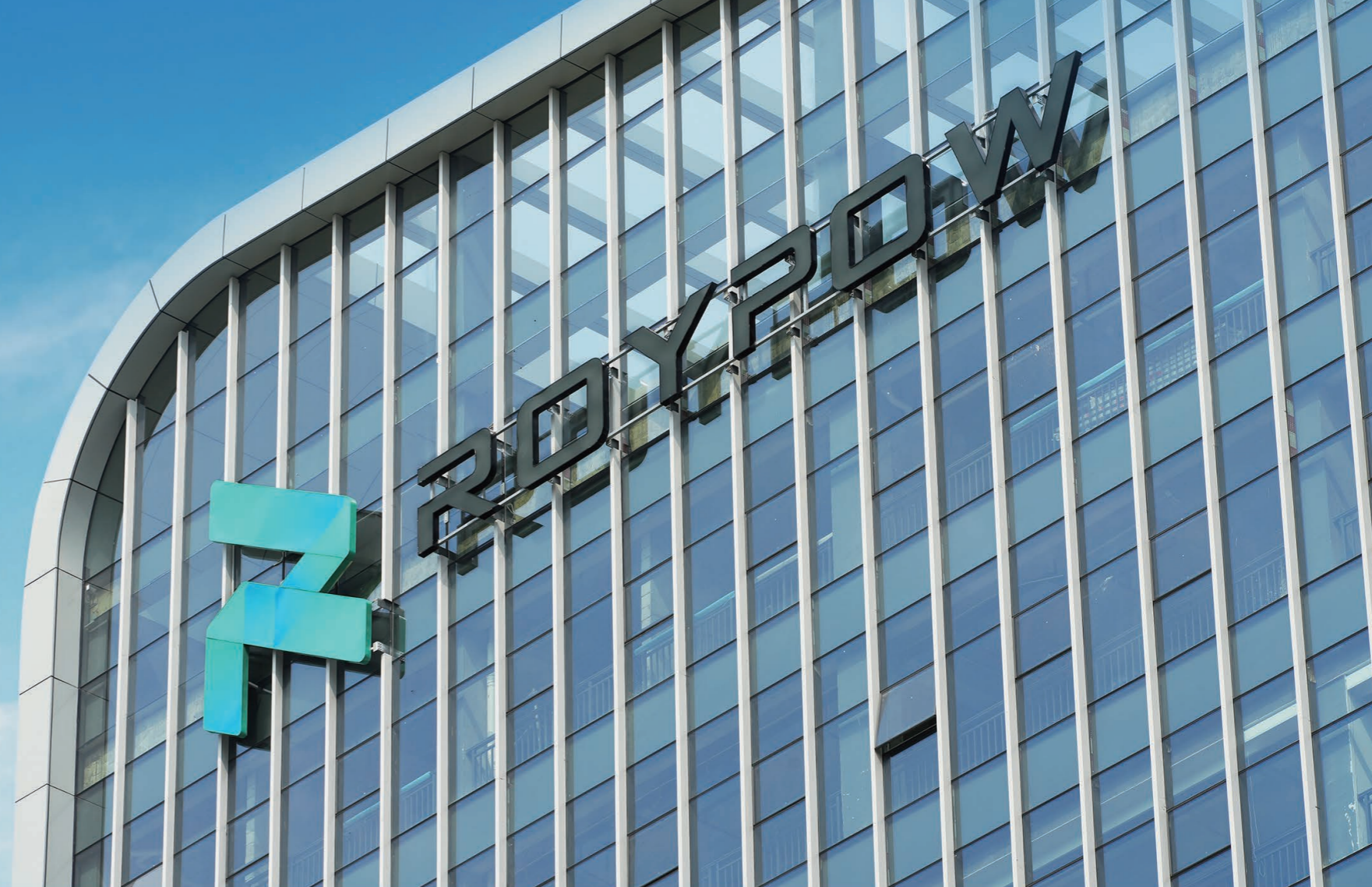
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Contents

01 / About Us

02 / New Technology, LiFePO<sub>4</sub> Battery

03 / LiFePO<sub>4</sub> Batteries  
for Floor Cleaning Machines

04 / More about ROYPOW  
Lithium Batteries

05 / ROYPOW Original Chargers  
for Floor Cleaning Machines

# ROYPOW

## For One-stop New Energy Solutions

- R&D, manufacturing and sales of motive power systems and energy storage systems as one-stop solutions
- Fully automatic production lines, a full range of test equipment and an advanced MES
- Covering Low-Speed Vehicles' Batteries, Industrial Batteries, as well as Residential ESS, Commercial & Industrial ESS, and Mobile ESS
- Self-development of power electronics technologies, including PCS, BMS, and EMS



**750+** Employees  
**190+** R&D People  
**105,000 m<sup>2</sup>** Headquarters Floor Area  
**2,500 m<sup>2</sup>** Testing Center  
**171** Patents

### Quality Control Certificates:

- ✓ Environmental Management System: ISO 14001:2015
- ✓ Occupational Health and Safety Management System: ISO 45001:2018
- ✓ Quality Management System: ISO 9001:2015, IATF16949:2016
- ✓ Information Security Management System: ISO/IEC 27001:2022
- ✓ Social Accountability Management System: SA8000:2014
- ✓ Hazardous Substance Process Management: IECQ QC 080000



### Product Certifications:

UL 1973, UL 9540A, UL 9540, UL 2580, UL 2271, UL 1741			FCC, IEC/EN 61000-6, BS EN IEC 61000-6
IEEE 1547			IEC 60730, ISO 13849-1
IEC 62619			UN 38.3
EN 62477, EN 62040, (EU) 2023/1542, EN 62109-1, EN 62109-2			RoHS Directive 2011/65/EU & (EU) 2015/863

### R&D and Manufacturing Highlights

As a result of these investments, ROYPOW is capable of "end-to-end" integrated delivery, making our products out-perform the industry norms.

- Fully Automatic Production Lines
- BMS, PCS, EMS All Designed in House
- All-round Testing
- Advanced MES System

### Global Sales and Service Network

- Timely Delivery
- Hassle-free After-sales Service
- Fast Response Technical Support

ROYPOW has comprehensively unfolded its overseas market layout to ensure the localization of R&D, manufacturing, marketing and service, becoming one of your most reliable and valuable partners.



### Upgrading to New Technology, with Our Turnkey Solutions.

With years of dedication to new energy solutions, we are proud to offer customers professional solutions for:

- Low-speed Vehicle Batteries
- Battery Systems for Off-highway Applications
- Residential Energy Storage Systems
- Mobile Energy Storage Systems
- Industrial Batteries
- Battery Systems for Emerging Applications
- Commercial & Industrial Energy Storage Systems
- Chargers



# New Technology. Create Great Value for Your Business

Converting from lead-acid to lithium-ion is easy and cost-effective and increases the productivity of the fleets and the operator.

Retrofit Your Fleet to Lithium-ion Batteries.



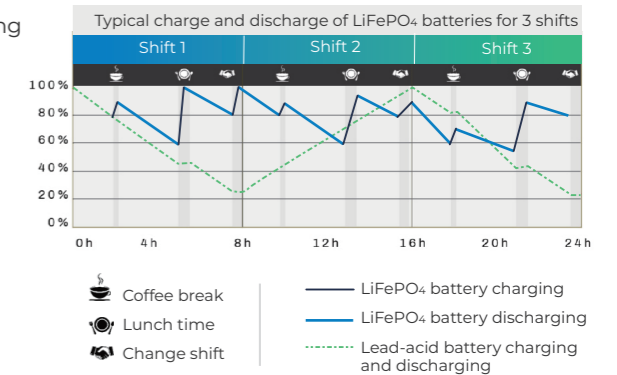
## Benefits of Lithium-ion Batteries

Lead-acid	LiFePO <sub>4</sub> battery	
 3 years design life	 <b>Longer life</b> up to 10 years design life 3 to 4 times lead-acid lifespan	<ul style="list-style-type: none"> <li>✓ Reduces overall battery investment</li> <li>✓ Eco-friendly</li> <li>✓ Minimize the need for spares</li> </ul>
 Frequent maintenance	 <b>0 maintenance</b> No maintenance no need for regular filling of distilled water and electrolyte	<ul style="list-style-type: none"> <li>✓ No regular filling of distilled water</li> <li>✓ Saving costs on labor and maintenance</li> <li>✓ Less unplanned downtime and improved productivity</li> <li>✓ No frequent battery replacements</li> </ul>
 1-2 years warranty	 <b>Extended warranty</b> 5 years warranty bring you peace of mind	<ul style="list-style-type: none"> <li>✓ Durable and reliable</li> <li>✓ Reduces maintenance and labor costs</li> <li>✓ Quality guarantee</li> </ul>

## Reduce Downtime, Increase Equipment Availability

In day-to-day operations, the battery can be charged even during short breaks, such as taking a rest or changing shifts, effectively increasing productivity.

- ✓ Reduces the need for a full charge every time.
- ✓ Eliminates the need for frequent time-consuming battery swaps.
- ✓ Eliminates the risk of battery-changing accidents.
- ✓ Opportunity charge during breaks, lunch and at shift changes. Charge anytime equipment is not in use.



## Rapid Charging

Whether you have a single-shift or a large fleet working 24/7, fast charge is one of the most important advantages.



TIPS

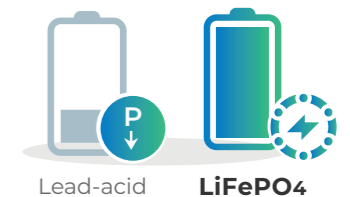
### Why choose LiFePO<sub>4</sub> batteries for industrial applications?

There are a few lithium-ion chemistries to choose from. ROYPOW uses LFP or Lithium Iron Phosphate, one of the most thermally stable and safe lithium-ion chemistries for industrial applications.

LFP offers longer life, is more energy-dense, more stable, is more compact, and weighs less than lead-acid. Our battery packs are sealed units requiring no daily or weekly watering and no maintenance. LFP is ideal for batteries used in industrial applications.

## Consistent Power

Lithium-ion batteries deliver consistently high performance, which maintains greater productivity even toward the end of a shift.



## Eliminate the Need for a Dedicated Charging Area and Frequent Battery Swaps

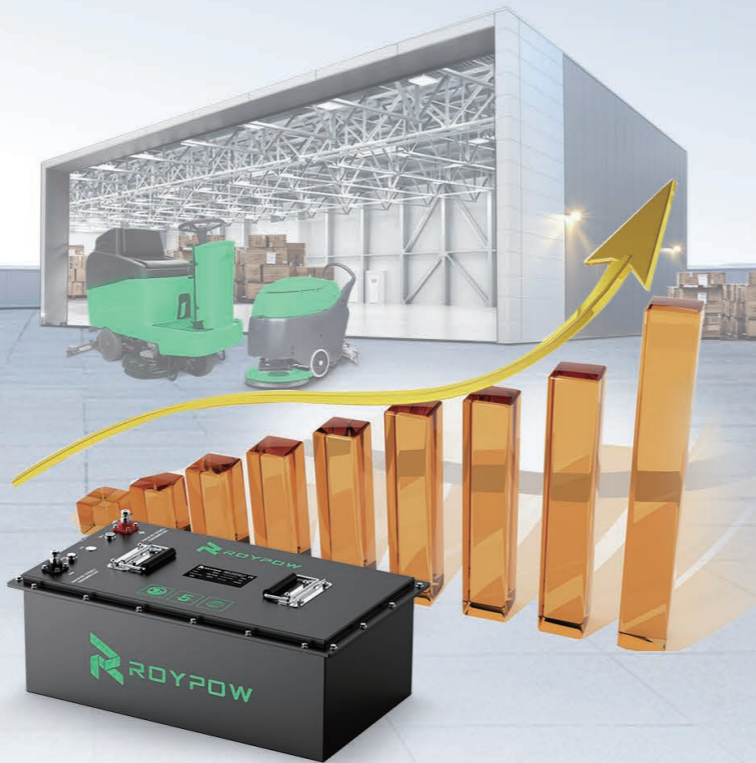
- ✓ Minimize the need to buy, store and maintain spares.
- ✓ Eliminate the cost and storage space required for additional lead-acid batteries.
- ✓ No gassing, no ventilation system needed when charging. No hazardous acid spills.



# Small Investment, Big Return



Converting your battery to lithium-ion may require a higher initial investment, but its ongoing savings on energy, equipment, labour and downtime can give you a more cost-effective bill in opposite.



## The LiFePO<sub>4</sub> batteries can offer you...

- ✓ Longer life reduces overall battery investment.
- ✓ No maintenance saves labor and maintenance costs.
- ✓ No gas or acid spills, avoids the space, equipment and running costs of a battery room and ventilation system.
- ✓ Energy saving and less downtime, improve productivity.

## 5-year Cost Comparison to Increase Your Overall Return on Investments.

Save Up to **70%** Expenses in 5 Years

Below is the 5-year expenditure table comparing ROYPOW LiFePO<sub>4</sub> batteries with lead-acid batteries.

Purchases over 5 Years	Lead-acid Battery	LiFePO <sub>4</sub> Battery
Battery cost	5 money bag icons	1 money bag icon
Maintenance	5 stack of coins icons	/
Electricity waste	5 stack of coins icons	/
Installation	5 stack of coins icons	1 stack of coins icon
Shipping	5 stack of coins icons	1 stack of coins icon

Remark: Actual costs may vary according to local conditions.

# ROYPOW Batteries with Smart & Integrated Systems

Provide exceptional performance to get the job done and improve your productivity, which means fewer hours of unplanned downtime and more productive hours on your work.

0 Maintenance  
Up to **3,500+** Cycle Life

5 yr Warranty  
Up to **10** yr Design Life



## Durable

ROYPOW batteries have an IP65 ingress rating. They will provide fast lifting and travel speeds at all levels of discharge, under all-weather working conditions.

## Inbuilt Protection

Intelligent BMS is for automatic cell balancing and advanced battery management. The LiFePO<sub>4</sub> batteries have greater thermal and chemical stability.

## Ideal Power for the Top Brands

ROYPOW lithium batteries are more reliable and will provide unmatched power for many floor cleaning machines.



Ideal battery solutions for most leading brands of floor cleaning machines. They can be generally applied in these famous floor cleaning machine brands:

Nilfisk/Advance  
Tennant  
Nilfisk  
Hako  
Kärcher

IPC  
Comac  
FIMAP  
Dulevo  
TVX

Viper  
Clarke  
ICE  
NSS  
Minuteman

PowerBoss  
Eureka  
Betco  
More>

Disclaimer: The information above is intended only to describe that products of ROYPOW are applicable to products of brands above under specific circumstances. It should not be regarded as any illegal use of third-party brands and trademarks. You should not infer that RoyPow has established or has any agency, employment, partnership or joint venture relationship with the companies above.

# Which LiFePO<sub>4</sub> Battery is Suitable for Your Floor Cleaning Machines?

We make 24, 36, and 48 volt systems to cover most Floor Cleaning Machines.

**One Stop for All of Your Battery Needs!**

## 24 V Battery System

For Walk Behind Sweepers & Scrubbers



## 36 V Battery System

For Ride-On Sweepers and Scrubbers



# LiFePO<sub>4</sub> Batteries for Floor Cleaning Machines

Switch to new technology, lithium drop-in replacements for lead-acid batteries.

- ✓ Superior performance from these safe, durable batteries.
- ✓ Keep your machines always ready to go!



## More Time Cleaning, Less Time Worrying

### Flexible and Worry-free

- ✓ Much lighter than the traditional battery.
- ✓ No frequent battery swapping.
- ✓ No Memory Effect, opportunity charge anytime.

### Stable and Sustained

- ✓ No acid spills, no noxious gas emissions.
- ✓ More thermal & chemical stability.
- ✓ High consistent performance without sudden power sag.

### A Good Investment

- ✓ Zero maintenance, to save labor and maintenance costs.
- ✓ Reduce unplanned downtime with fast, efficient, opportunity charging.
- ✓ No battery swapping, reduce related accidents and resulting employee injuries.
- ✓ Up to 10 years design life reduces overall battery investment.

Save Up to  
**70%**  
Expenses in 5 Years

# Why ROYPOW LiFePO<sub>4</sub> Batteries

## 5 Year Warranty

5 year warranty and timely technical support.



## Steady Output

LiFePO<sub>4</sub> batteries keep a very steady power output. They are intended for applications.

## Heating Function (Optional)

Heating function to warm up the battery at a low temperature for charging and discharging.



## Long Life

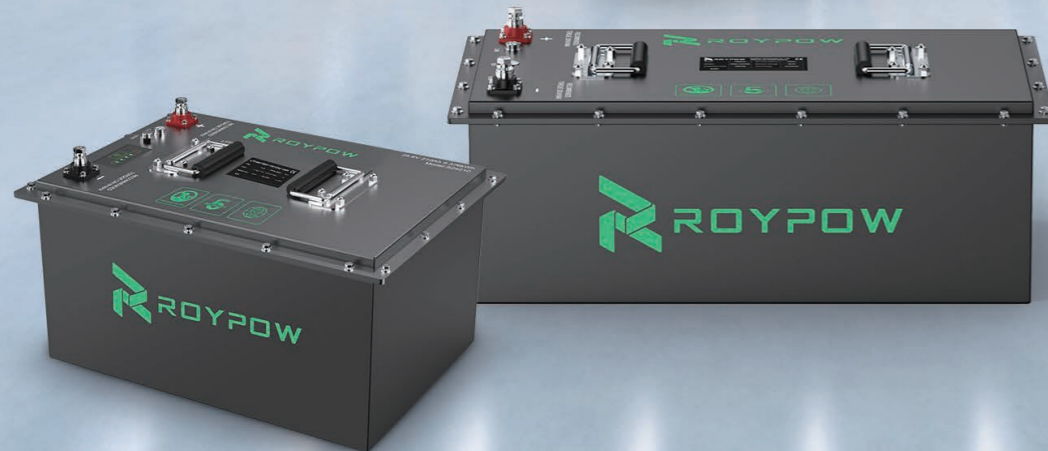
3,500+ cycle life outperforms traditional batteries.

## Key Features



## Intelligent BMS

All-time cell balancing and multiple built-in protections, including short circuit protection, high temperature protection, high voltage protection and so on to get better performance and longer life.



# Specifications



Model	Technical Specifications					Discharge Current		General				
	Nominal Voltage	Nominal Capacity	Stored Energy	Cycle Life	Dimensions (L*W*H)	Weight lbs. (kg)	Continuous Discharge	Maximum Discharge	Casing Material	IP Rating		
<b>24 V System</b>												
S2460A	25.6 V	60 Ah	1.54 kWh	>3,500 times	12.1x6.6x8.9 inch (307x168x226 mm)	33 lbs. (15 kg)	60 A	200 A (30 S)	ABS	IP65		
S2460D		60 Ah	1.54 kWh		11.42x9.65x9.84 inch (290x245x250 mm)	46.30 lbs. (21 kg)	65 A	200 A (30 S)		IP67		
S24100C		100 Ah	2.56 kWh		13.31x12.09x9.16 inch (338x307x232.7 mm)	63.49 lbs. (28.8 kg)	100 A	250 A (30 S)		IP67		
S24150A		150 Ah	3.84 kWh		15.75x12.99x10.24 inch (440x330x260 mm)	85.5 lbs. (38.8 kg)	150 A	250 A (30 S)	Steel	IP67		
W24200A		200 Ah	5.12 kWh		19.2x13.8x10.80 inch (488x350x274.3 mm)	101.41 lbs. (46 kg)	150 A	250 A (30 S)		IP67		
S24210C		210 Ah	5.38 kWh		19.2x13.8x10.8 inch (488x350x274.3 mm)	101.41 lbs. (46 kg)	150 A	250 A (30 S)		IP67		
S24315C		315 Ah	8.06 kWh		23.62x13.78x11.15 inch (600x350x283.3 mm)	139.33 lbs. (63.2 kg)	150 A	250 A (30 S)		IP67		
<b>36 V System</b>												
S38100A	38.4 V	100 Ah	3.84 kWh	>3,500 times	15.34 x 10.83 x 10.63 inch (389.6 x 275.1 x 270 mm)	94.80±4.41 lbs (43±2 kg)	150 A	250 A (30 S)		IP67		
S38150A		150 Ah	5.76 kWh		20.47x16.14x8.91 inch (520x410x226.2 mm)	127.87 lbs. (58 kg)	150 A	250 A (30 S)		IP67		
W38200A		200 Ah	7.68 kWh		22.60x19.68x12.51 inch (574x500x317.9 mm)	136.68 lbs. (62 kg)	150 A	250 A (30 S)	Steel	IP67		
S38210B		210 Ah	8.06 kWh		23.62x13.78x10.80 inch (600x350x274.3 mm)	142.86 lbs. (64.8 kg)	150 A	250 A (30 S)		IP67		
S38210C		210 Ah	8.06 kWh		23.62x13.78x11.15 inch (600x350x283.3 mm)	139.33 lbs. (63.2 kg)	150 A	250 A (30 S)		IP67		
S38280A		280 Ah	10.75 kWh		22.61x19.69x12.52 inch (574.3x500x317.9 mm)	209.44 lbs. (95 kg)	150 A	250 A (30 S)		IP67		
<b>Working Temperature Range</b>												
		Charge			Discharge		Storage (1 month)		Storage (1 year)			
		-4°F~131°F (-20°C ~ 55°C)		-4°F~131°F (-20°C ~ 55°C)		-4°F~131°F (-20°C ~ 55°C)		32°F~95°F (0°C~35°C)				

- All pictures shown are for reference only and data are based on ROYPOW standard test procedures.
- Actual performance may vary according to local conditions. Only authorized personnel are allowed to operate or make adjustments to the batteries.
- We reserve the right to make revisions as well as product alterations and improvements at any time without prior notice.



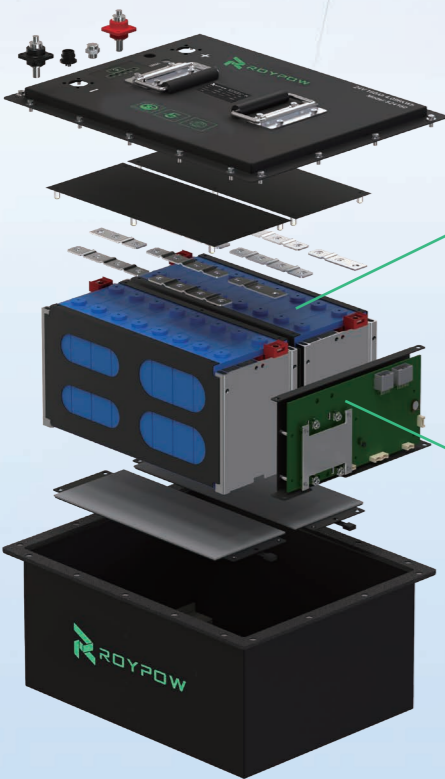


# More about ROYPOW Lithium-ion Batteries



Quality and safety always come first. Except those benefits, we also have intelligent design from our professional R&D team.

- Maintenance free
- Fast charge
- Long life
- Ultra safe



## Intelligent design

**Battery pack module**  
Using LiFePO<sub>4</sub> cells to insure stable and safe battery performance.

**Built-in BMS**  
For cell balancing and advanced battery management.

## Battery management system (BMS)

The built-in BMS is equipped with automotive-grade components assuring safe, top quality and high energy density. To provide a fully optimized solution for demanding industrial applications. BMS software ensures the battery to provide peak performance when in operation, to deliver longer run time between charges, to maximize the total battery lifespan and to communicate well between the charger, battery and users.



### The BMS can offer:

**All-time cell balancing and battery management.**

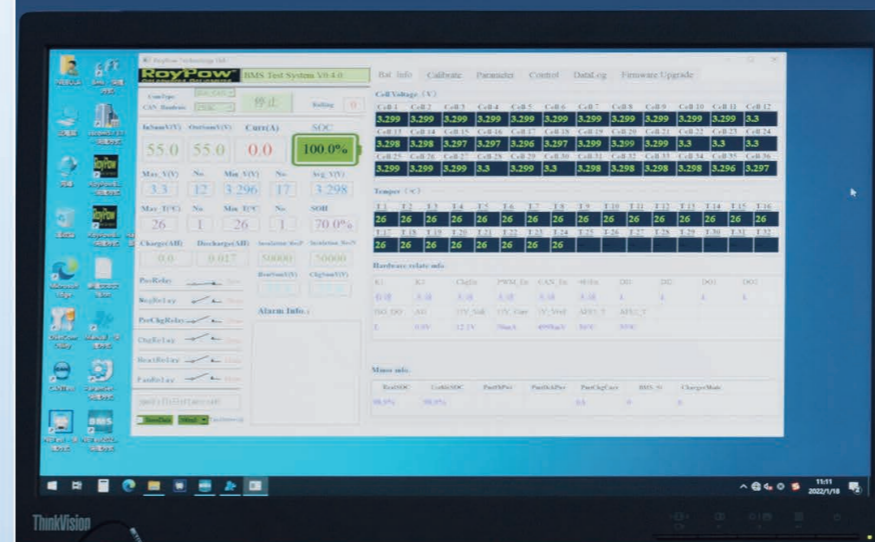
Through the intelligent balancing strategy, balancing between individual cells can be realized. The BMS can keep the battery's consistency at all times when in operation, maximizing the battery efficiency and improve the battery's working life.

**Battery real-time monitoring and communication through CAN.**

Monitoring cell voltage, electric current and battery temperature, so that any movement outside of normal range disconnects the cell or the entire battery.

**Fault alarm and safety protection.**

When the battery is less than 10%, it will beep to prompt for charging in case of stopping somewhere far away from charge station suddenly without notice. Over/under voltage, low/over temperature, over current or other faults will prompt to make the battery safe. Safety always comes first.



# Original Charger for Floor Cleaning Machines

ROYPOW has developed chargers specifically for each type of lithium batteries to deliver the optimal battery performance, safeguard the driving experience, and keep the best communication between our LiFePO4 batteries and the chargers.



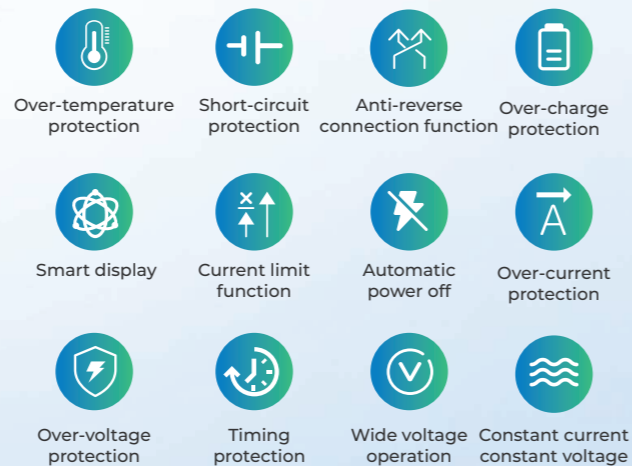
## Intelligent Charging Management

To use the ROYPOW charger, the battery management system (BMS) can control the charging current according to different temperatures and SOC of the batteries.

ROYPOW's intelligent BMS ensures the safety of the battery and improves the charging efficiency.

When the battery is at a low voltage, the battery can be charged at low current to ensure battery safety.

When the battery is less than 10%, it will beep to prompt for charging.



### Anti-walking Function

During the charging process, without disconnecting the plug, the equipment cannot be started.

### Waterproof

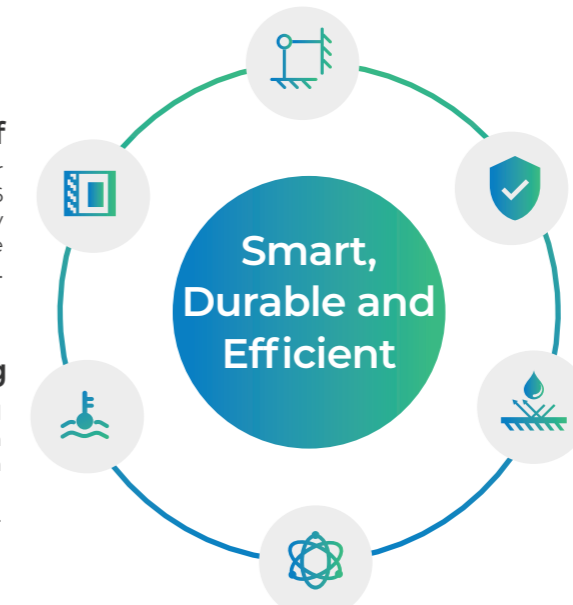
Get rid of the AC adapter to realise the real IP66 rate, no need to worry about water or debris like dirt or mud.

### Natural Cooling

It is sealed but with a natural cooling function without a fan for better heat dissipation capacity and to extend the lifespan.

### Intelligent Protection

With the advanced technology of arc resistance hot-swap to keep the charger safe and extend its lifespan.



### Safe Charging

Advanced charge algorithm ensures the batteries to be charged correctly and safely.

### Corrosion Protection & Vibration Resistance

Aluminum alloy design with the one-body forming technology which is more corrosion protection and vibration resistance.

## Compatibility

TIPS

Our chargers are compatible with the voltages in most countries and regions. And it's applied to cater to various charge modes and the multiple AC plugs for choices.

### Single phase:

China 220V 50Hz    America 120V 60Hz  
Europe 230V 50Hz    Japan 100V 50Hz/60Hz



### AC input port

can be compatible with plugs from different countries.



### DC output port

is configured as ROYPOW exclusive charging adaptor.

